



# **West Nile Virus Activity in California 2005**

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California Department of Health Services**



# WNV Team at DHS

- **VBDS**

- ✓ Stan Husted
- ✓ Al Hom
- ✓ Ryan Carney
- ✓ Kerry Padgett
- ✓ Lauren Marcus
- ✓ Colleen Barclay
- ✓ Anne Kjemtrup
- ✓ Mark Novak
- ✓ Renjie Hu
- ✓ Hotline staff
- ✓ Regional biologists

- **DIS**

- ✓ Jon Rosenberg

- **VPHS**

- ✓ Ben Sun
- ✓ James Glover
- ✓ Claudia Erickson

- **VRDL**

- ✓ Carol Glaser
- ✓ Cynthia Jean
- ✓ Cindi Cossen
- ✓ Liz Baylis
- ✓ Shilpa Gavali

- **OPA**

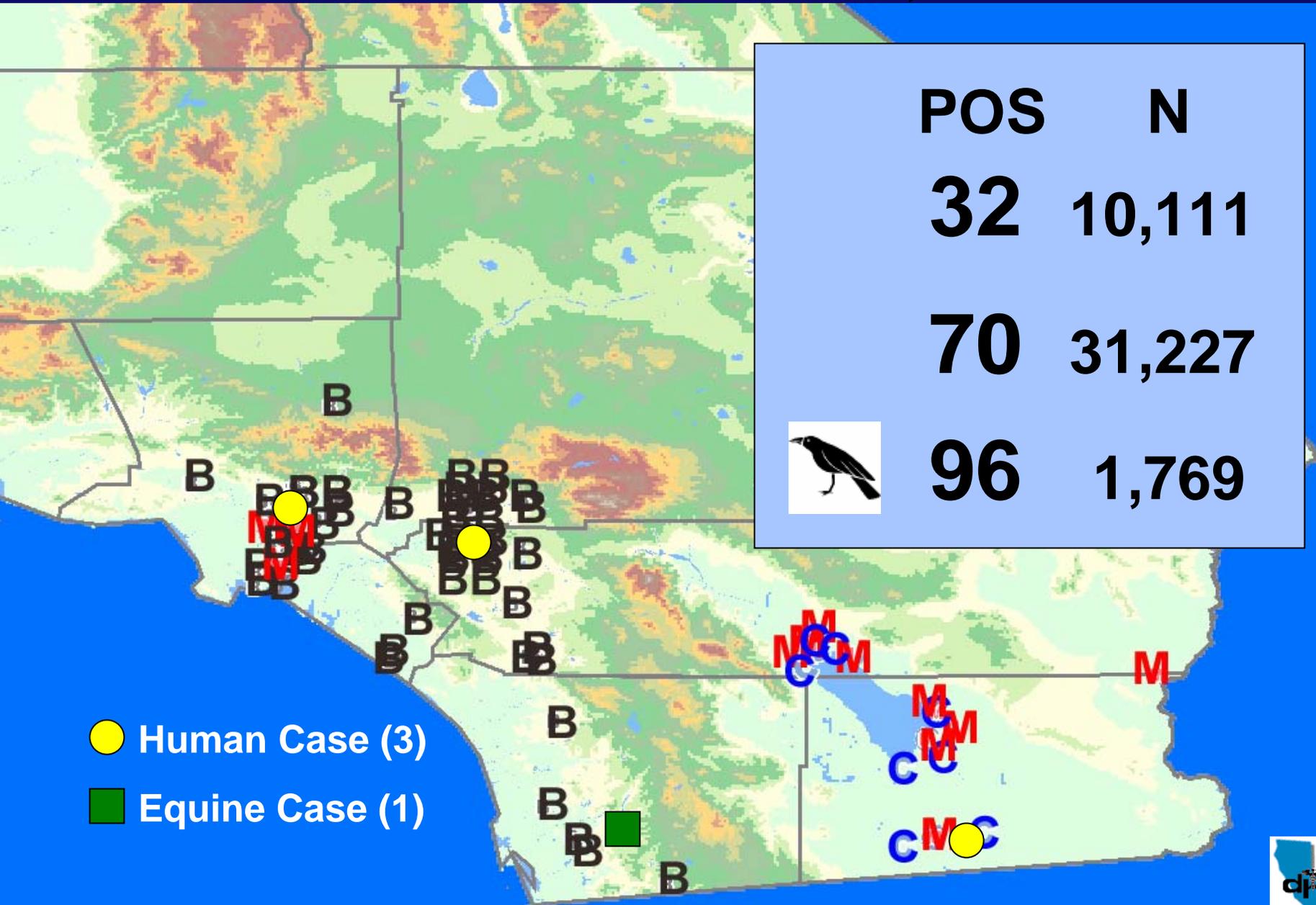
- ✓ Lea Brooks

# Collaborators



- Local Health Departments
- Local Public Health Laboratories
- Environmental Health Departments

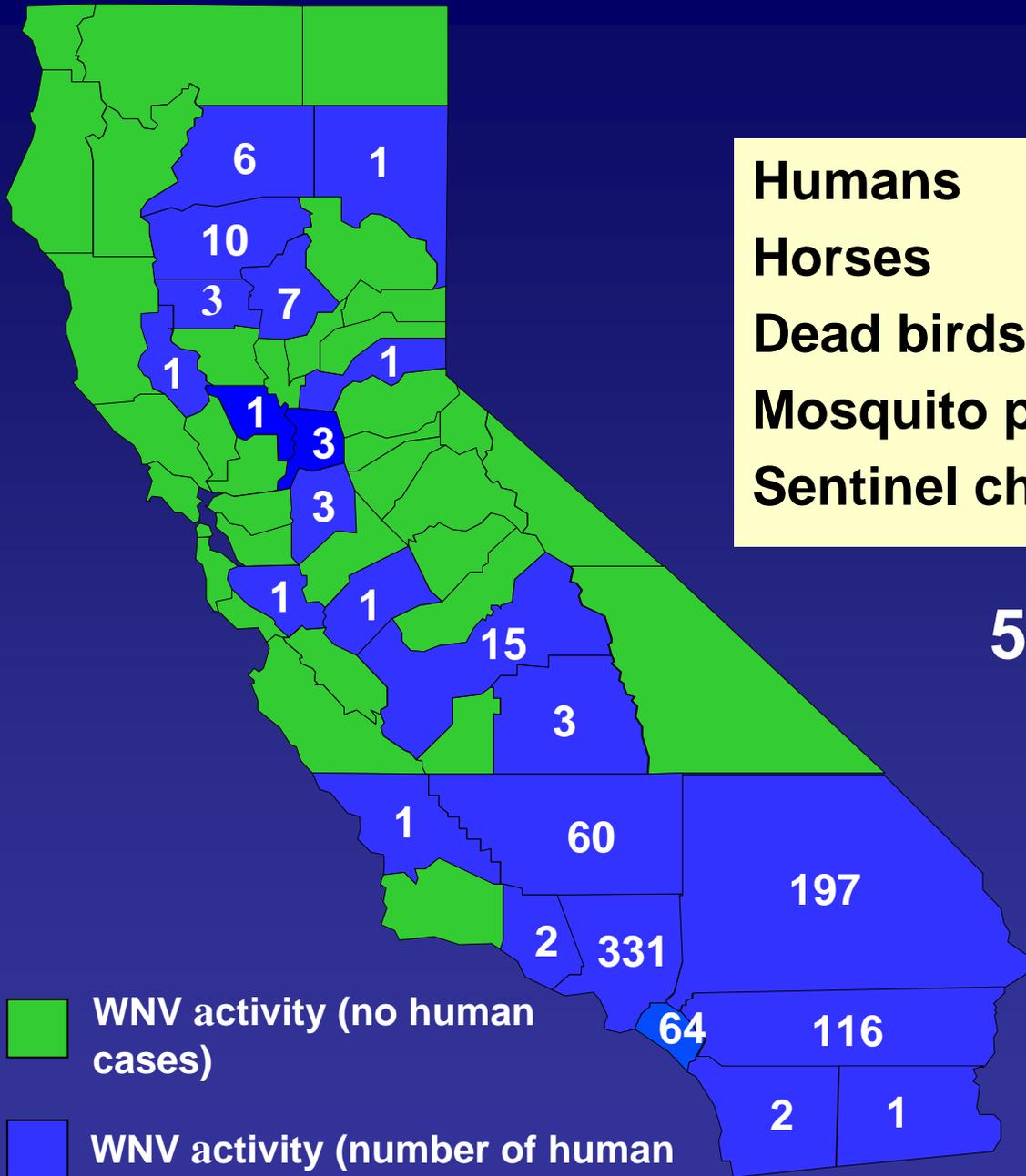
# WNV in California, 2003



# 2004

Humans	830 / 28
Horses	540 / 230
Dead birds	3232
Mosquito pools	1136
Sentinel chickens	805

58 counties

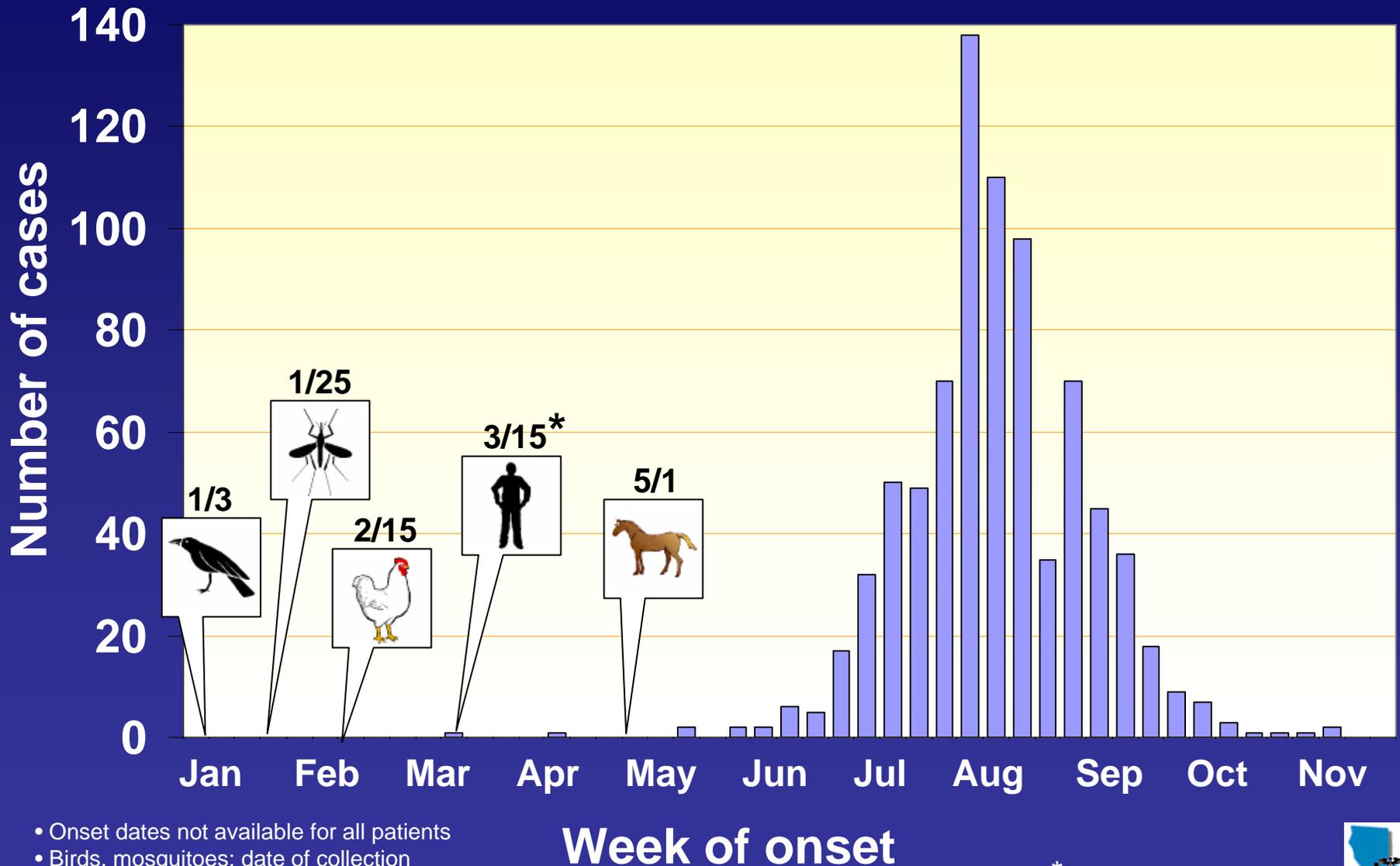


 WNV activity (no human cases)

 WNV activity (number of human infections)



# Sequence of WNV detection events in California relative to human case onset, 2005



- Onset dates not available for all patients
- Birds, mosquitoes: date of collection
- Chickens: date of probable seroconversion

\* Estimated date of onset



# March 2005

**Humans, onset / reported** 1 / 0

**Horses, onset / reported** 0

**Dead birds** 57

**Mosquito pools** 1

**Sentinel chickens** 1

**N = 1 county with  
human infection**

 WNV activity (no human cases)

 WNV activity (number of human cases with known onset date)

1



# April 2005

**Humans, onset / reported** 2 / 0

**Horses, onset / reported** 0

**Dead birds** 63

**Mosquito pools** 1

**Sentinel chickens** 1

**N = 2 counties with  
human infection**

 WNV activity (no human cases)

 WNV activity (number of human cases with known onset date)



# May 2005

**Humans, onset / reported** 4 / 0

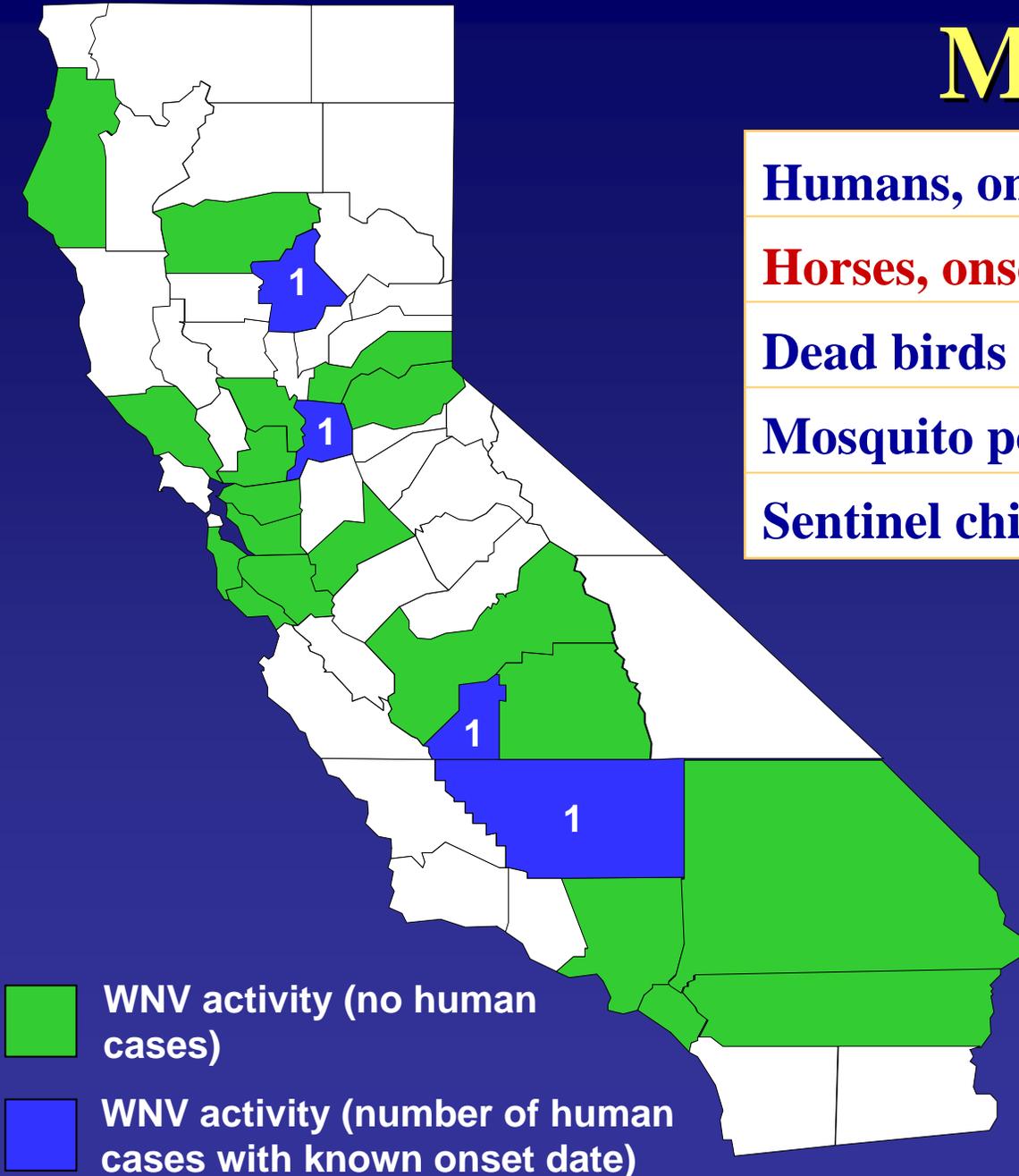
**Horses, onset / reported** 1 / 1

**Dead birds** 101

**Mosquito pools** 6

**Sentinel chickens** 3

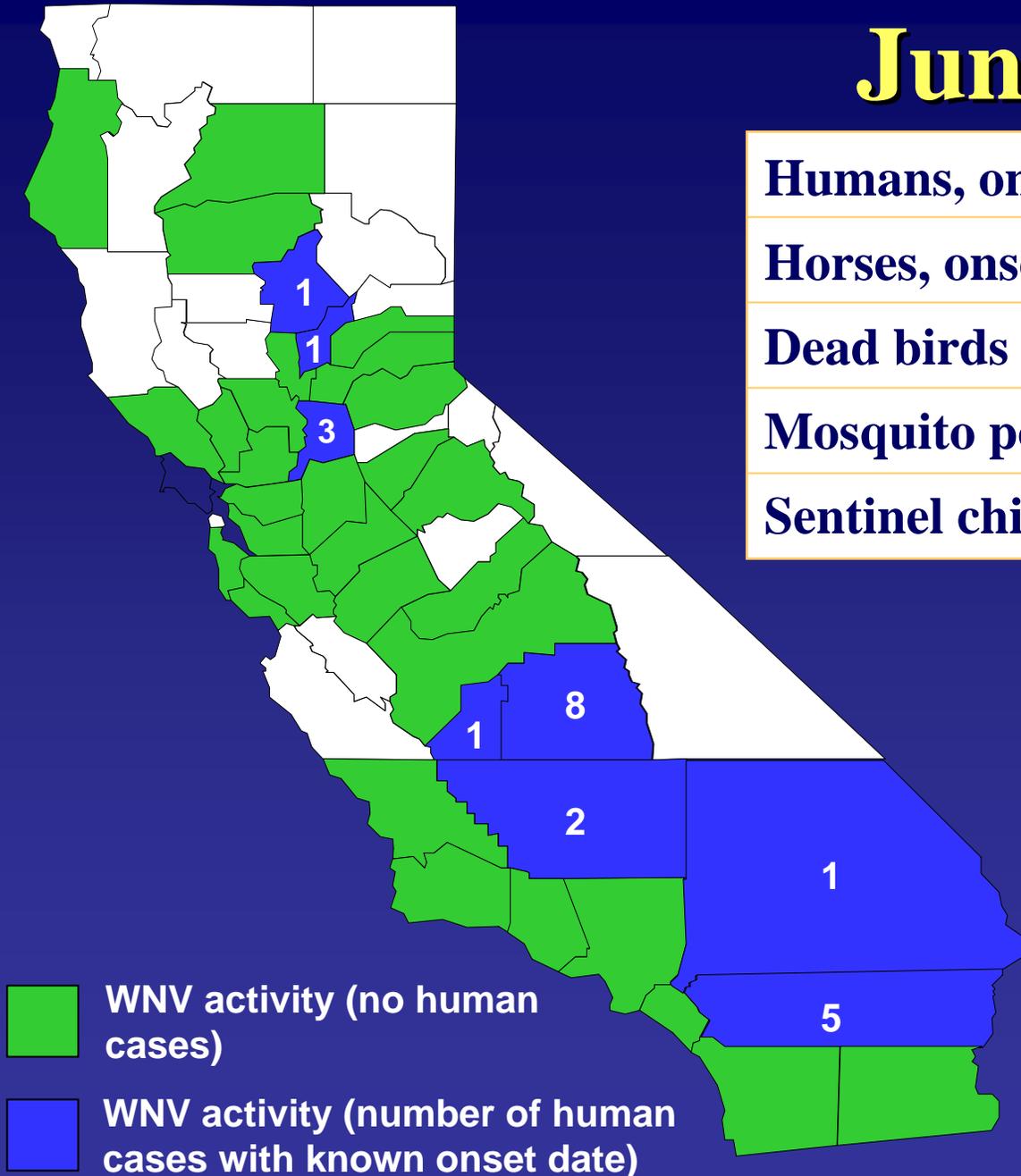
**N = 4 counties with human infection**



# June 30, 2005

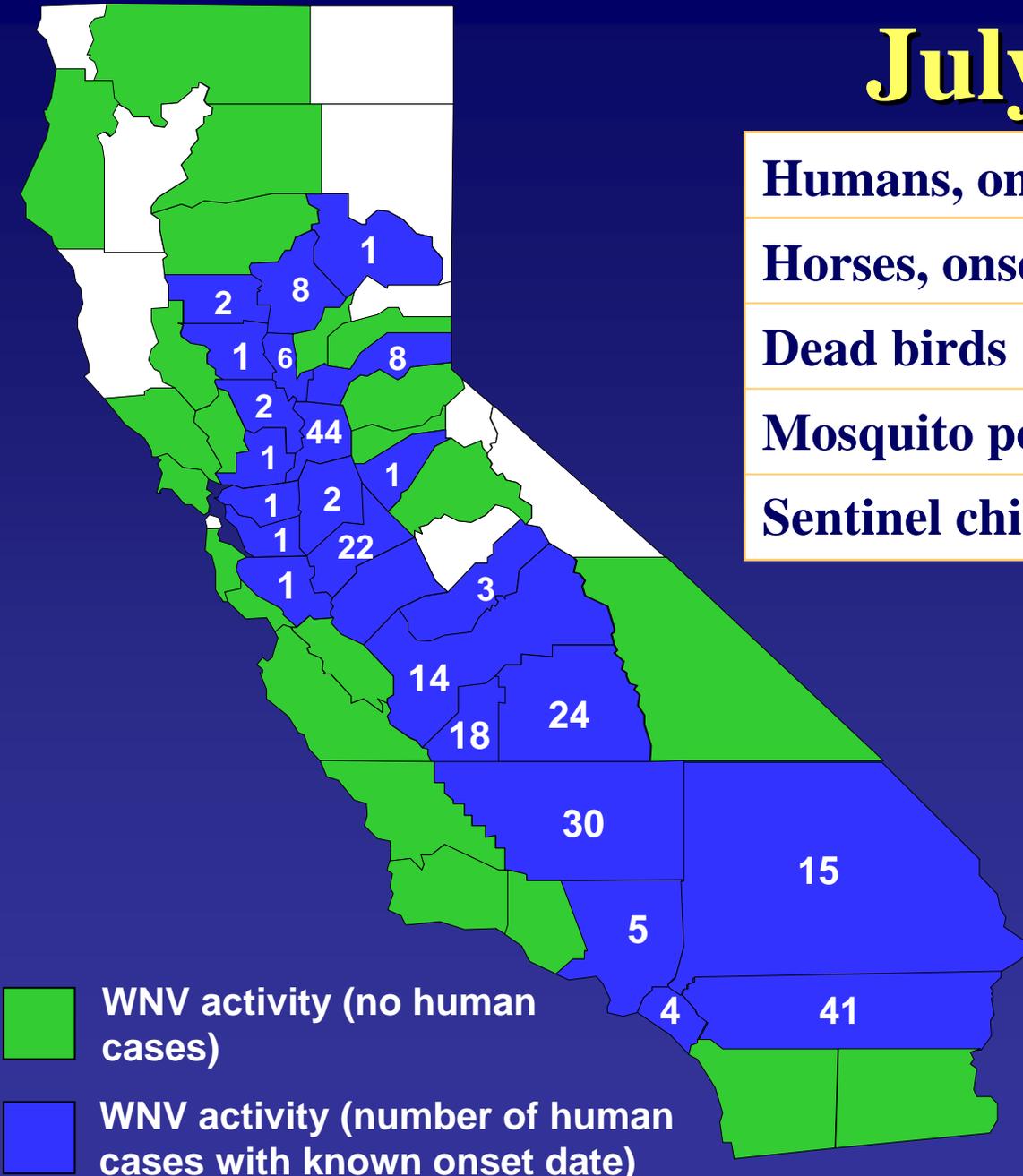
Humans, onset / reported	22 / 2
Horses, onset / reported	8 / 3
Dead birds	437
Mosquito pools	137
Sentinel chickens	14

**N = 8 counties with human infection**



# July 31, 2005

<b>Humans, onset / reported</b>	<b>254 / 56</b>
<b>Horses, onset / reported</b>	<b>116 / 48</b>
<b>Dead birds</b>	<b>1,216</b>
<b>Mosquito pools</b>	<b>588</b>
<b>Sentinel chickens</b>	<b>179</b>



**N = 24 counties with human infection**

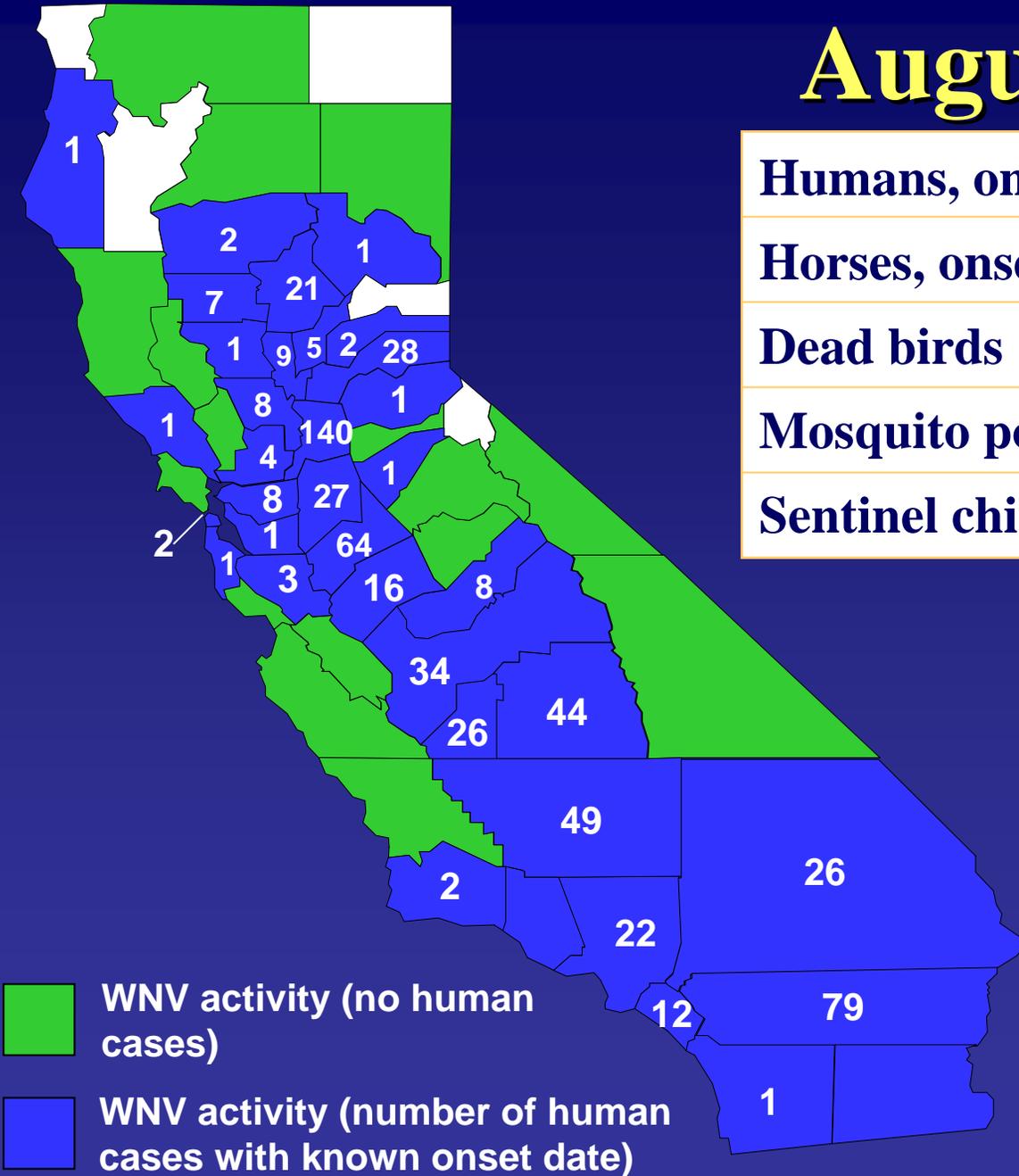
**Green** WNV activity (no human cases)

**Blue** WNV activity (number of human cases with known onset date)



# August 31, 2005

<b>Humans, onset / reported</b>	<b>656 / 416</b>
<b>Horses, onset / reported</b>	<b>343 / 277</b>
<b>Dead birds</b>	<b>2,306</b>
<b>Mosquito pools</b>	<b>1,040</b>
<b>Sentinel chickens</b>	<b>557</b>

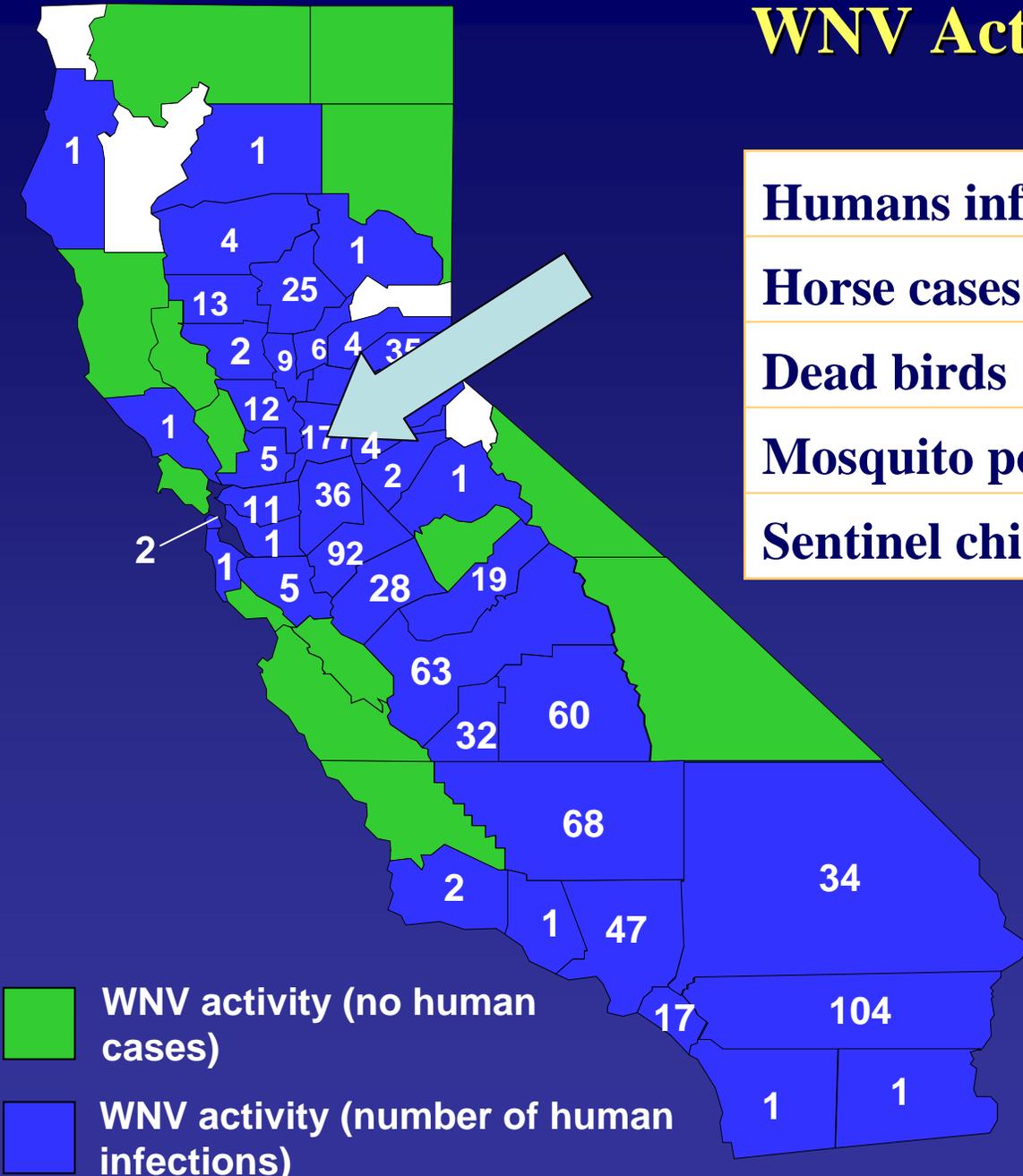


**N = 37 counties with human infection**



# WNV Activity in California 2005

<b>Humans infections</b>	<b>928</b>
<b>Horse cases</b>	<b>456</b>
<b>Dead birds</b>	<b>3,046</b>
<b>Mosquito pools</b>	<b>1,242</b>
<b>Sentinel chickens</b>	<b>790</b>



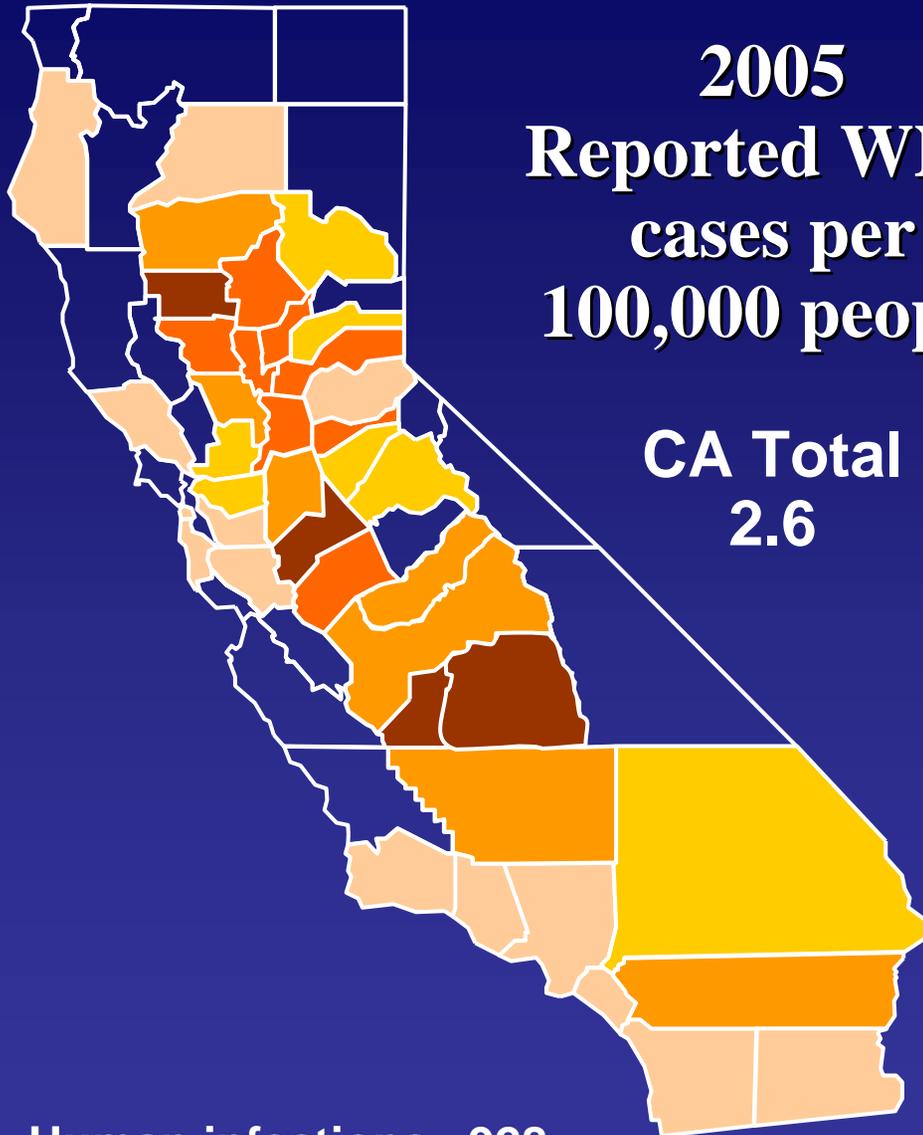
**N = 40 counties with human infection**

WNV activity (no human cases)  
 WNV activity (number of human infections)



# 2005 Reported WNV cases per 100,000 people

CA Total  
2.6



Human infections 928

Glenn	49.1	
Kings	24.7	
Stanislaus	19.6	$\geq 15$
Tulare	15.2	

Sacramento	14.2	
Placer	14.0	
Merced	13.3	
Butte	11.8	$\geq 10$
Sutter	11.4	
Amador	11.4	
Colusa	10.6	
Yuba	10.0	

Madera	9.8	
Kern	9.5	
Fresno	7.6	
Yolo	7.1	$\geq 5$
San Joaquin	6.4	
Riverside	6.4	
Tehama	7.1	

Calaveras	4.9	
Plumas	4.8	
Nevada	4.3	
San Bernardino	1.9	$\geq 1$
Tuolumne	1.8	
Solano	1.3	
Contra Costa	1.2	

Others		$> 0$
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# Top Ten Counties with Human WNV Infections

## 2004

<b>Los Angeles</b>	<b>323</b>
San Bernardino	191
Riverside	112
Orange	64
Kern	60
Fresno	15
Tehama	10
Butte	7
Shasta	6
Glenn	3

## 2005

Sacramento	177
Riverside	104
Stanislaus	92
Kern	67
Fresno	63
Tulare	60
Los Angeles	47
San Joaquin	36
Placer	35
San Bernardino	34



# Human WNV Infections

## 2004 - 2005

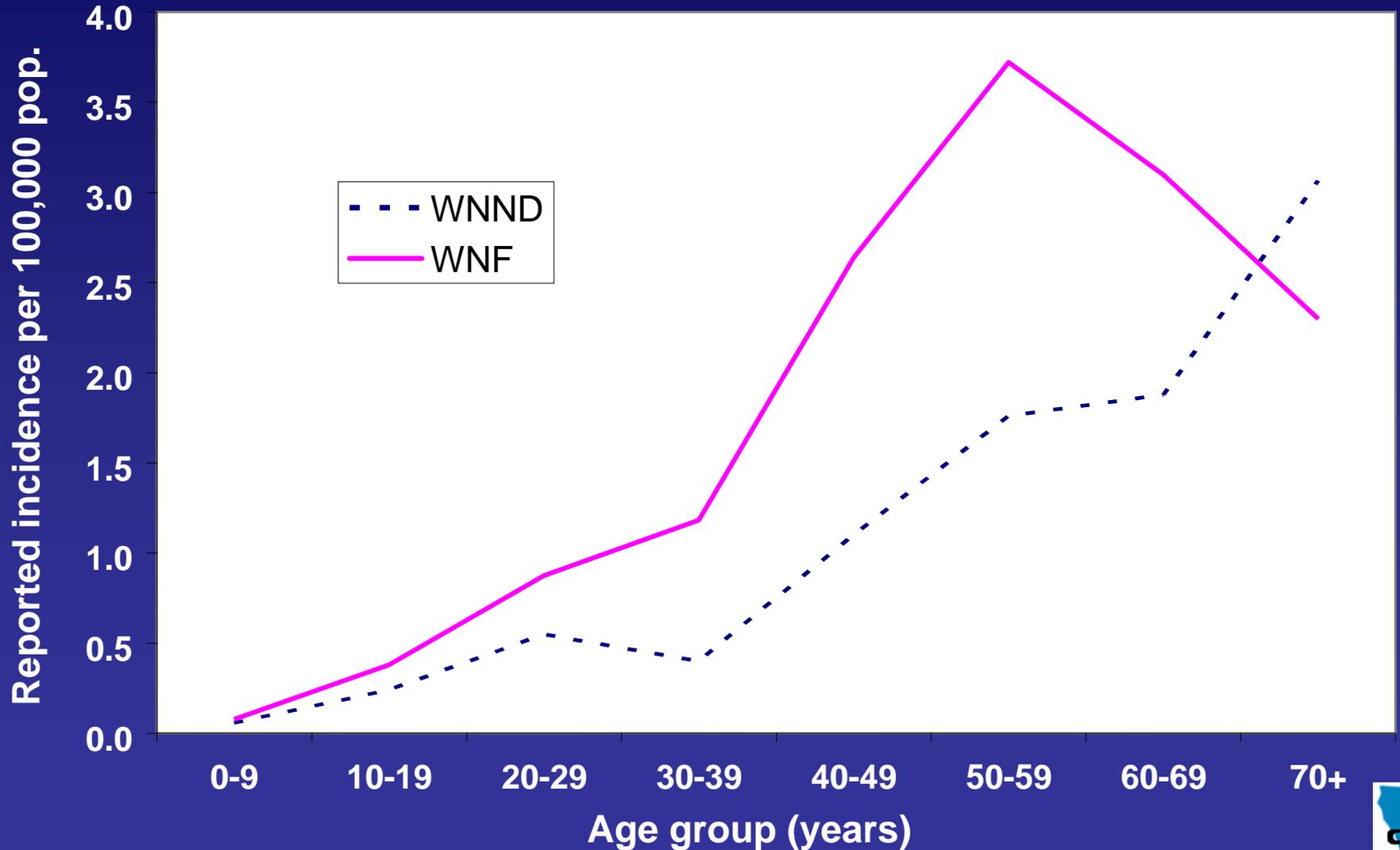
	2004	2005
<b>Human infections</b>	<b>830</b>	<b>928</b>
<b>Counties</b>	<b>23</b>	<b>40</b>
<b>Positive blood donors</b>	<b>66</b>	<b>93</b>
<b>Symptomatic donors</b>	<b>15 (23%)</b>	<b>42 (45%)</b>

# Human WNV Clinical Presentation 2004 - 2005

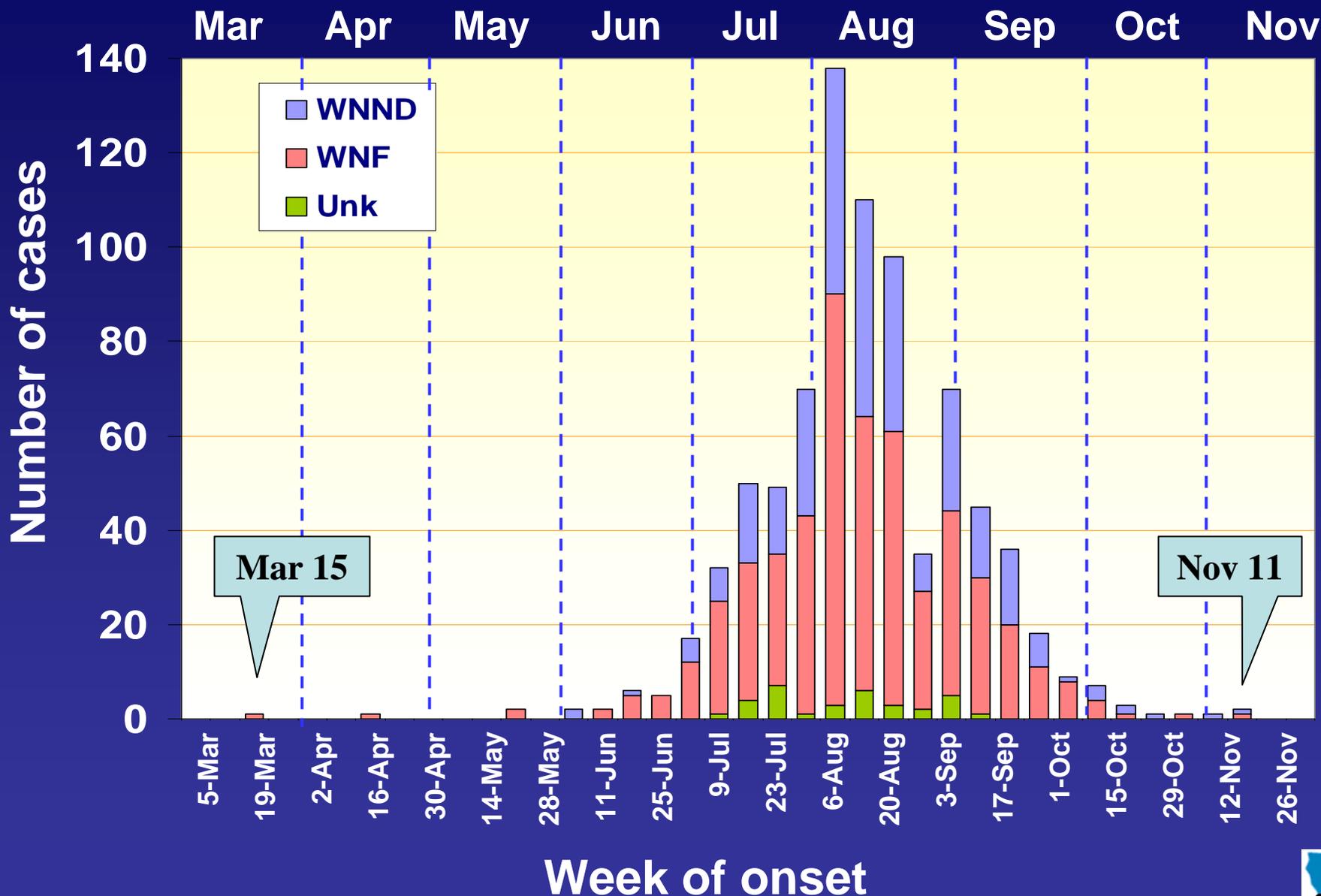
	2004	2005
Number of symptomatic cases	779	873
<b>Clinical presentation</b>		
Neuroinvasive	289 (42%)	301 (36%)
Fever	395 (58%)	524 (64%)
Unknown	95	48
Median age	52 yrs	51 yrs
Fatal cases	28	18
Median age of fatalities	76 yrs	79 yrs

# Incidence of WNV illness by age and clinical presentation California 2005

(n=818)



# Human WNV Cases in California, 2005

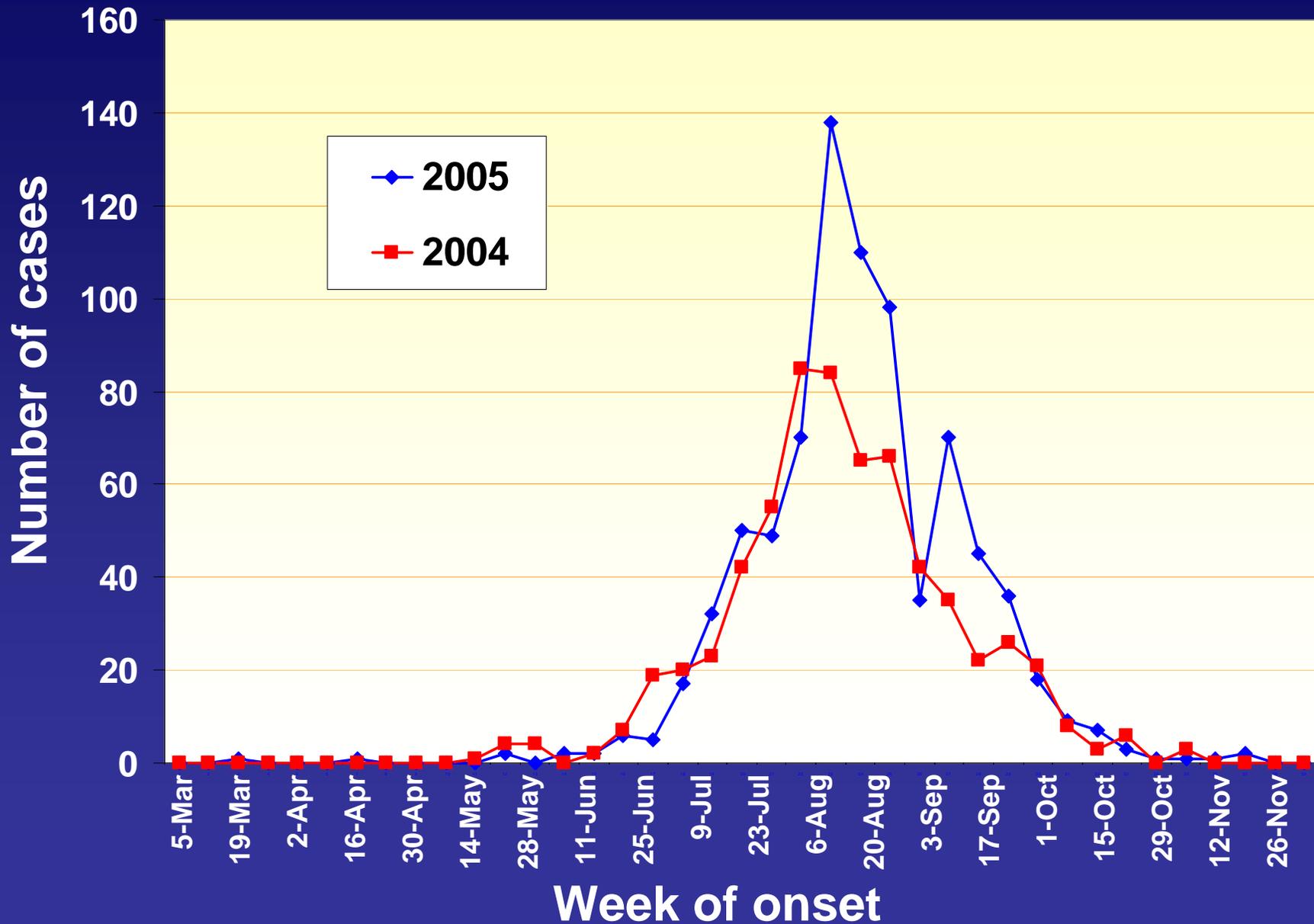


• Onset dates not available for all patients

\* Estimated date of onset



# Onset of Human Illness 2004 - 2005



# Dead Bird Surveillance

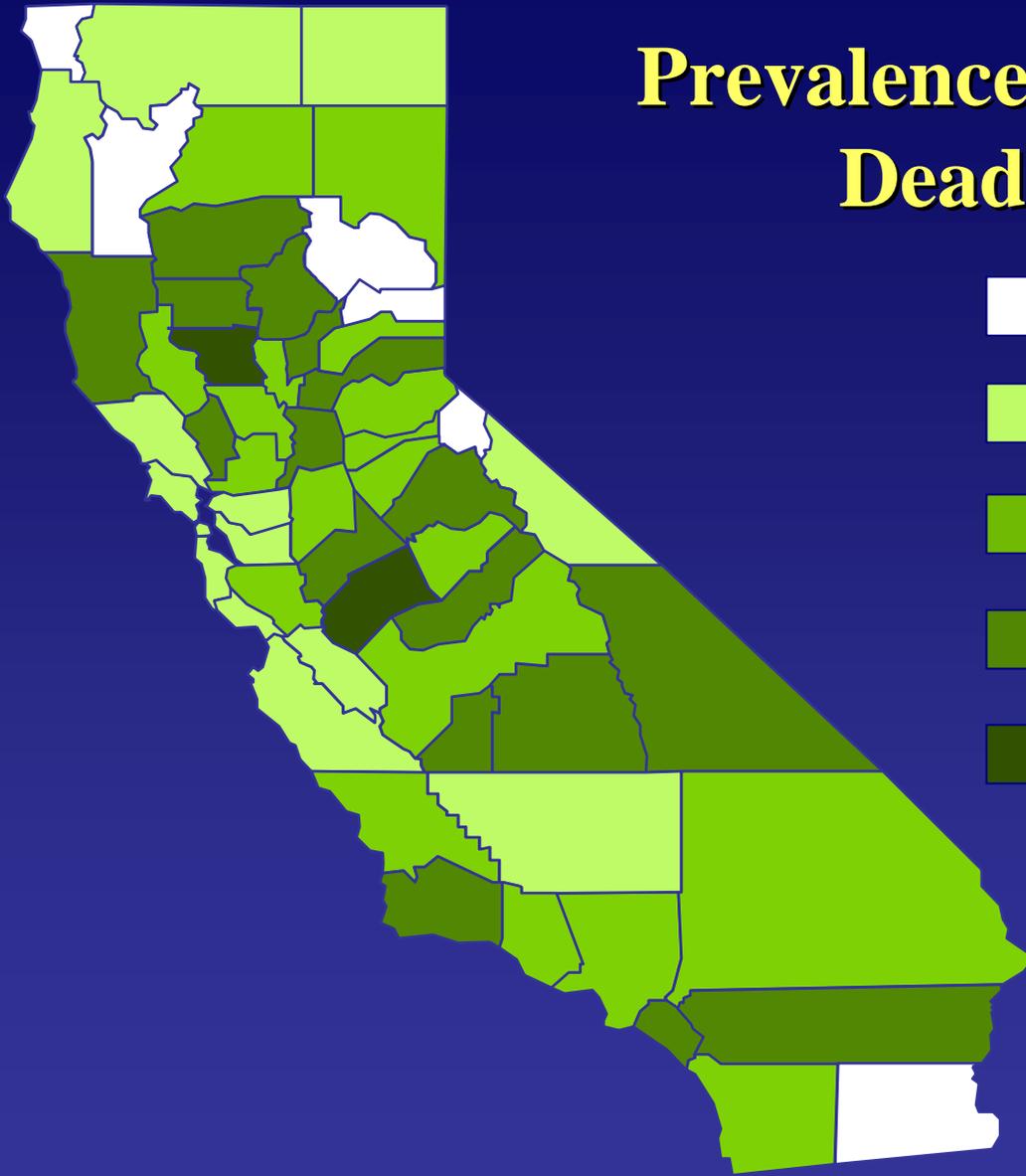


# Dead Bird Surveillance Program 2000 - 2005

<b>Year</b>	<b>Reported</b>	<b>Tested</b>	<b>Positive</b>
<b>2000</b>	<b>40</b>	<b>20</b>	<b>0</b>
<b>2001</b>	<b>68</b>	<b>18</b>	<b>0</b>
<b>2002</b>	<b>3,666</b>	<b>653</b>	<b>0</b>
<b>2003</b>	<b>8,650</b>	<b>1,765</b>	<b>96</b>
<b>2004</b>	<b>93,057</b>	<b>5,728</b>	<b>3,232</b>
<b>2005</b>	<b>109,375</b>	<b>9,263</b>	<b>3,046</b>



# Prevalence of WNV in Tested Dead Birds\*, 2005

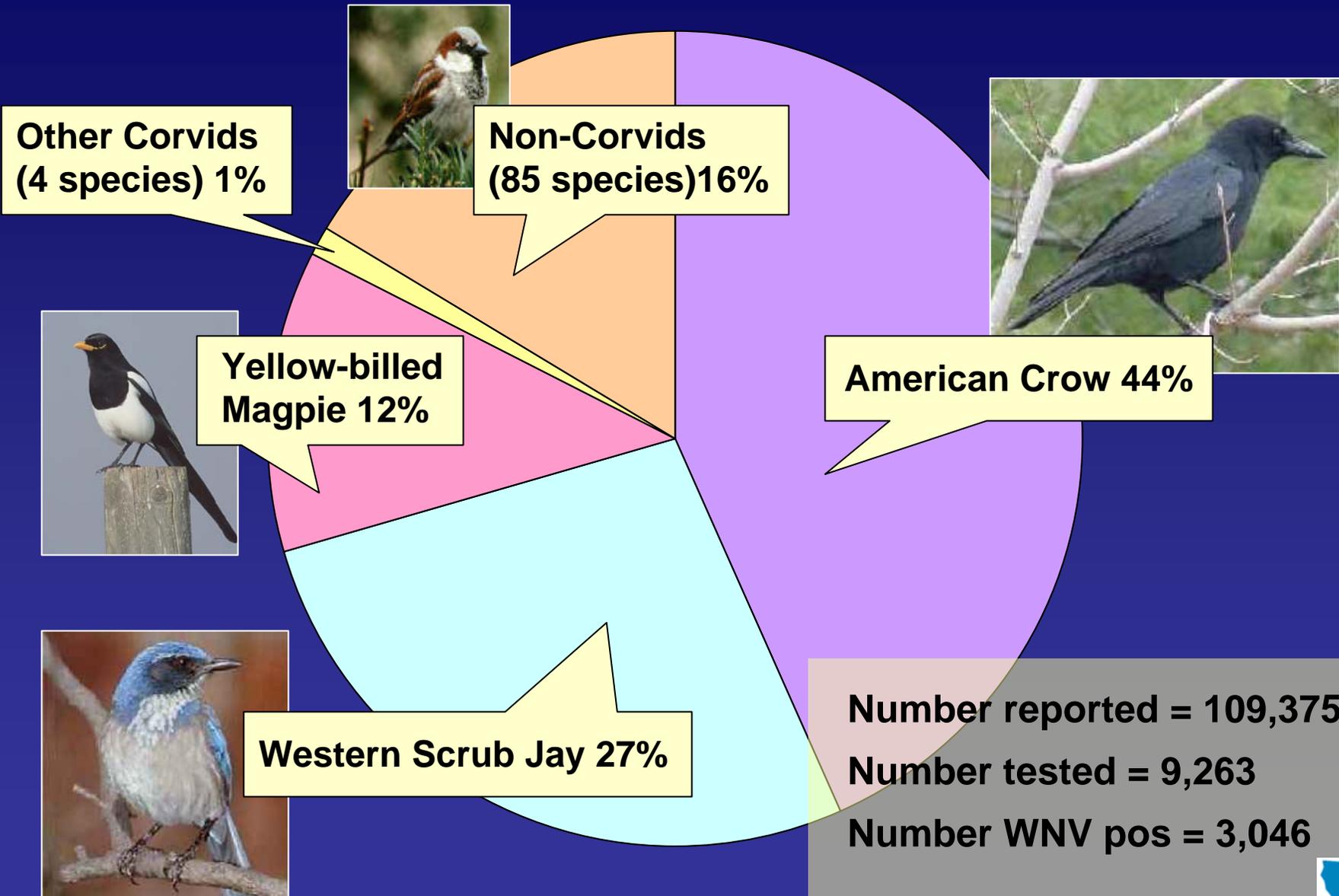


- No positive birds
- 1 – 19 %
- 20 – 39 %
- 40 – 59 %
- 60 – 79 %

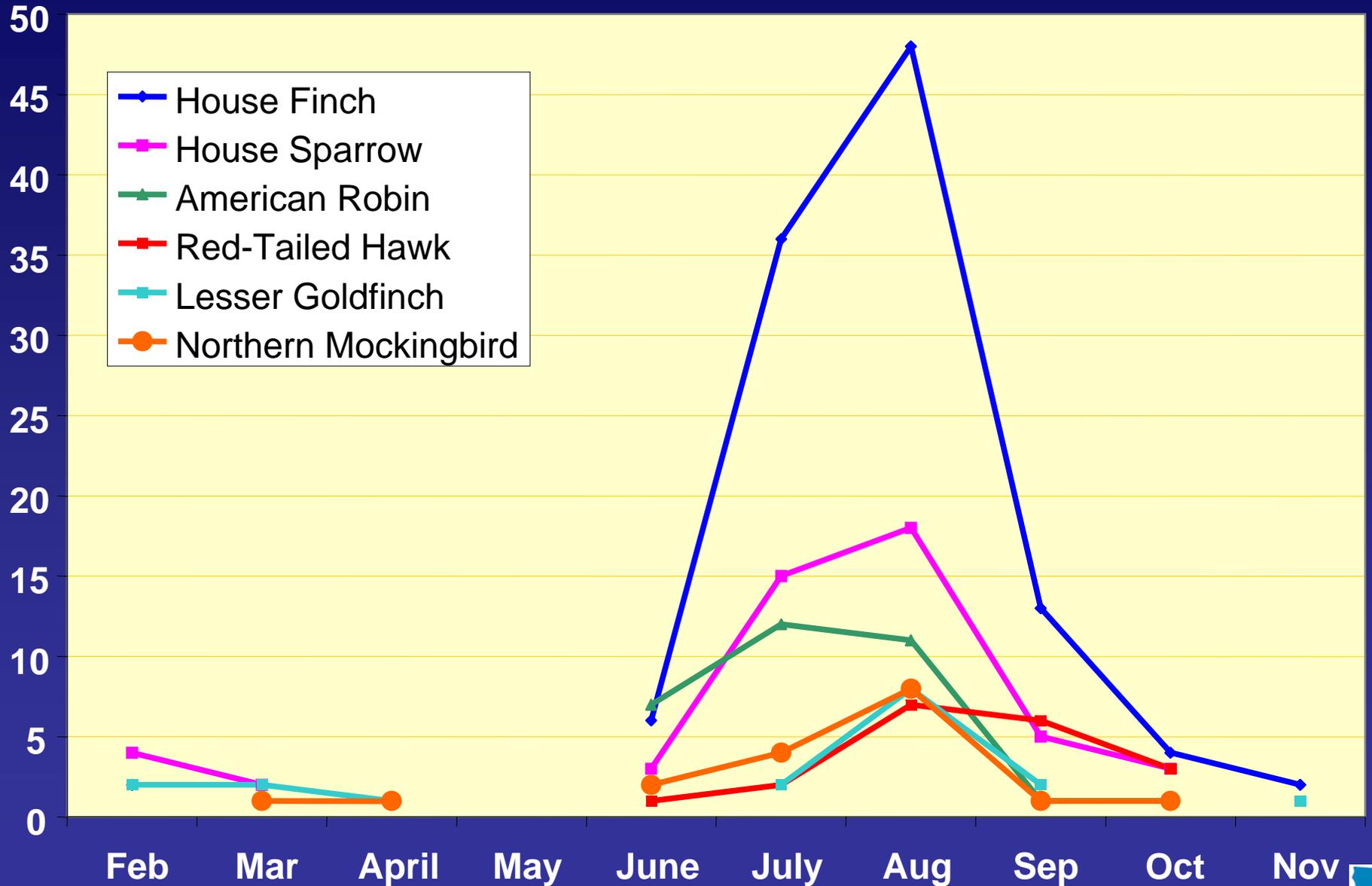
\* Prevalence = (# pos birds / # tested birds) x 100



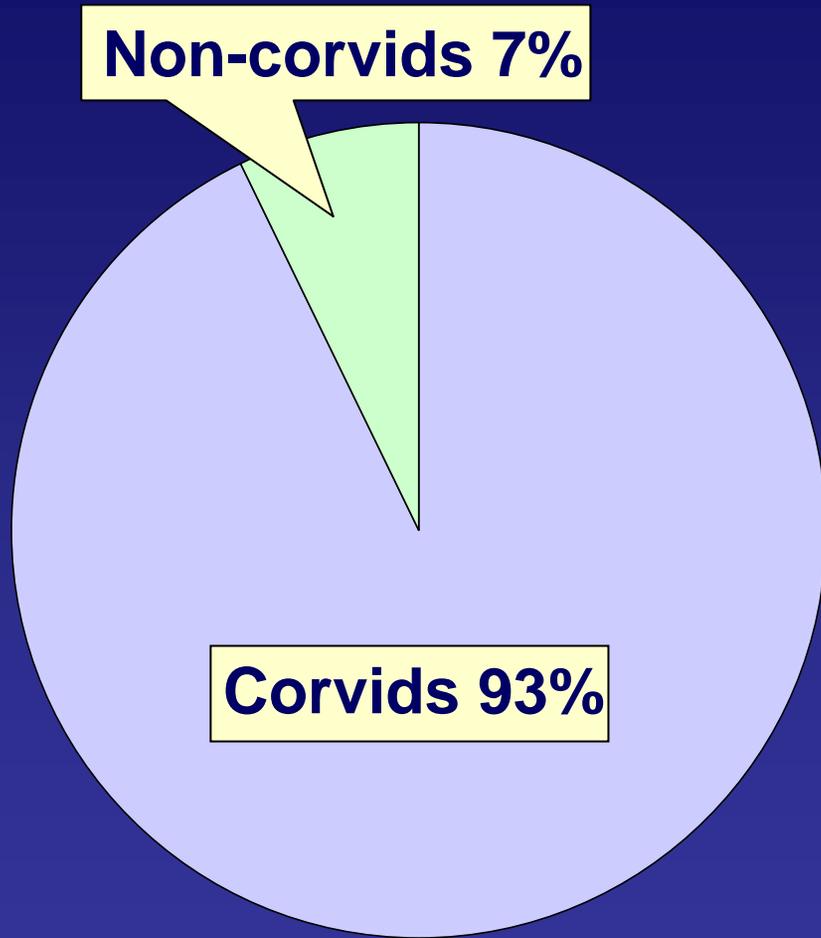
# 2005: 92 species of WNV positive dead birds



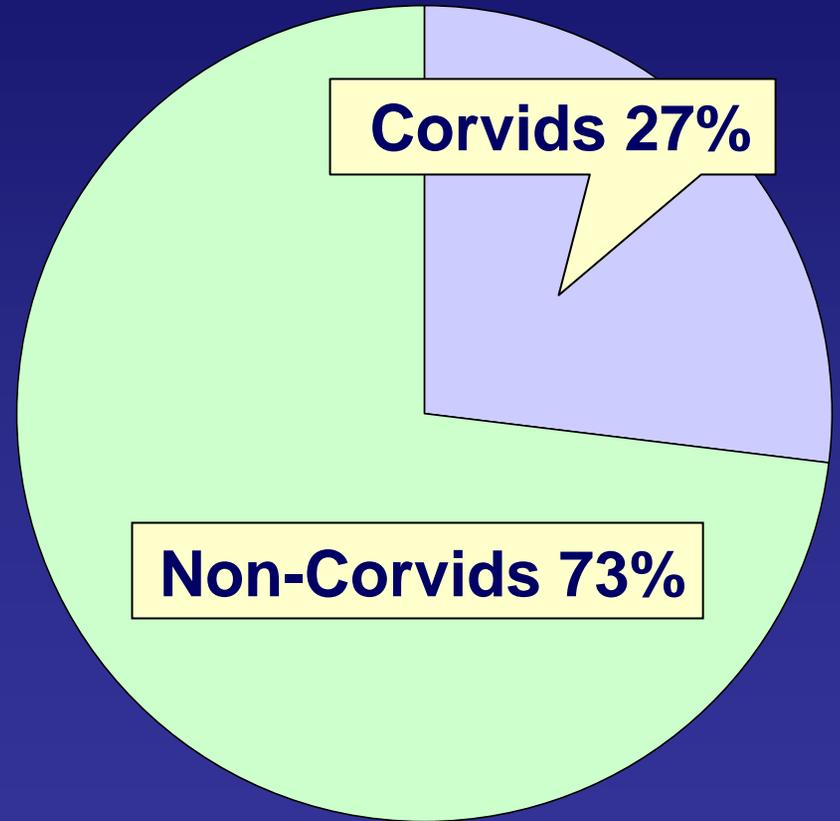
# Top 6 WNV Positive Non-Corvids, 2005



# WNV Positive Corvids and Non-Corvids January-April



2004



2005



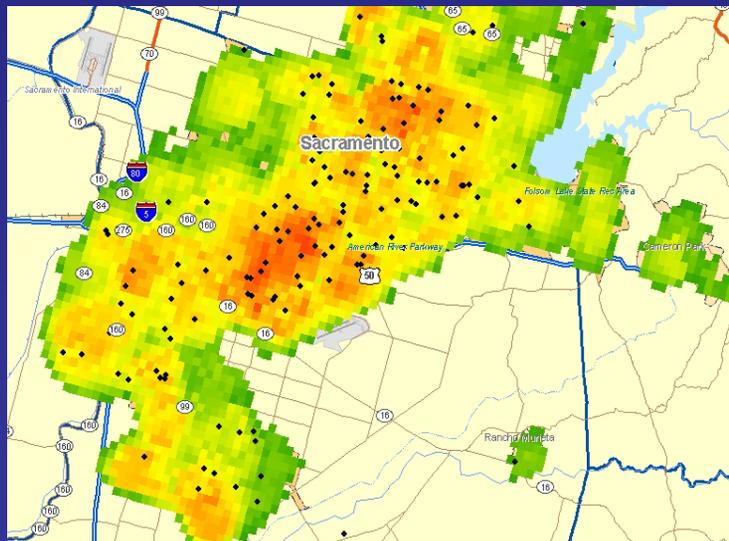
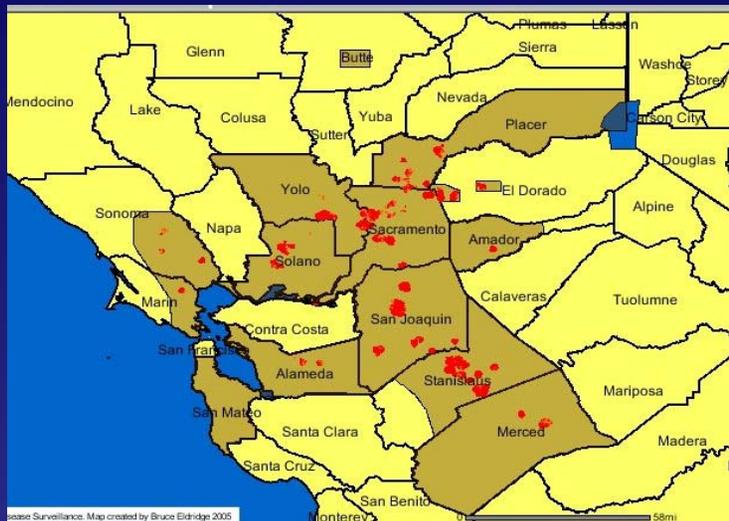


# Dead Birds Reported 2005

n = 109,375



# DYCAST\* Human WNV Risk Modeling System



## DYCAST in 2005

- **83% accuracy** in predicting human cases with quarter-square mile resolution (cells)
- **50% of cases** occurred in cells identified as high risk approximately **one month** prior to case onset
- Used to evaluate efficacy of **aerial adulticiding** in Sacramento County

\* Dynamic Continuous-Area Space-Time



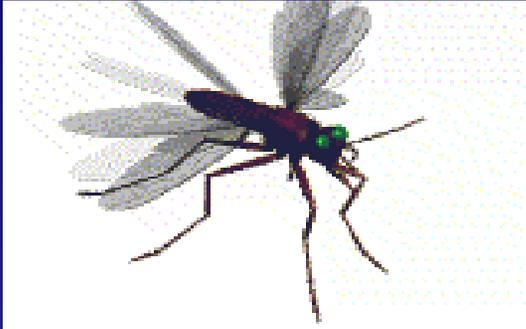
# WNV in California

## Tree Squirrels - 2005



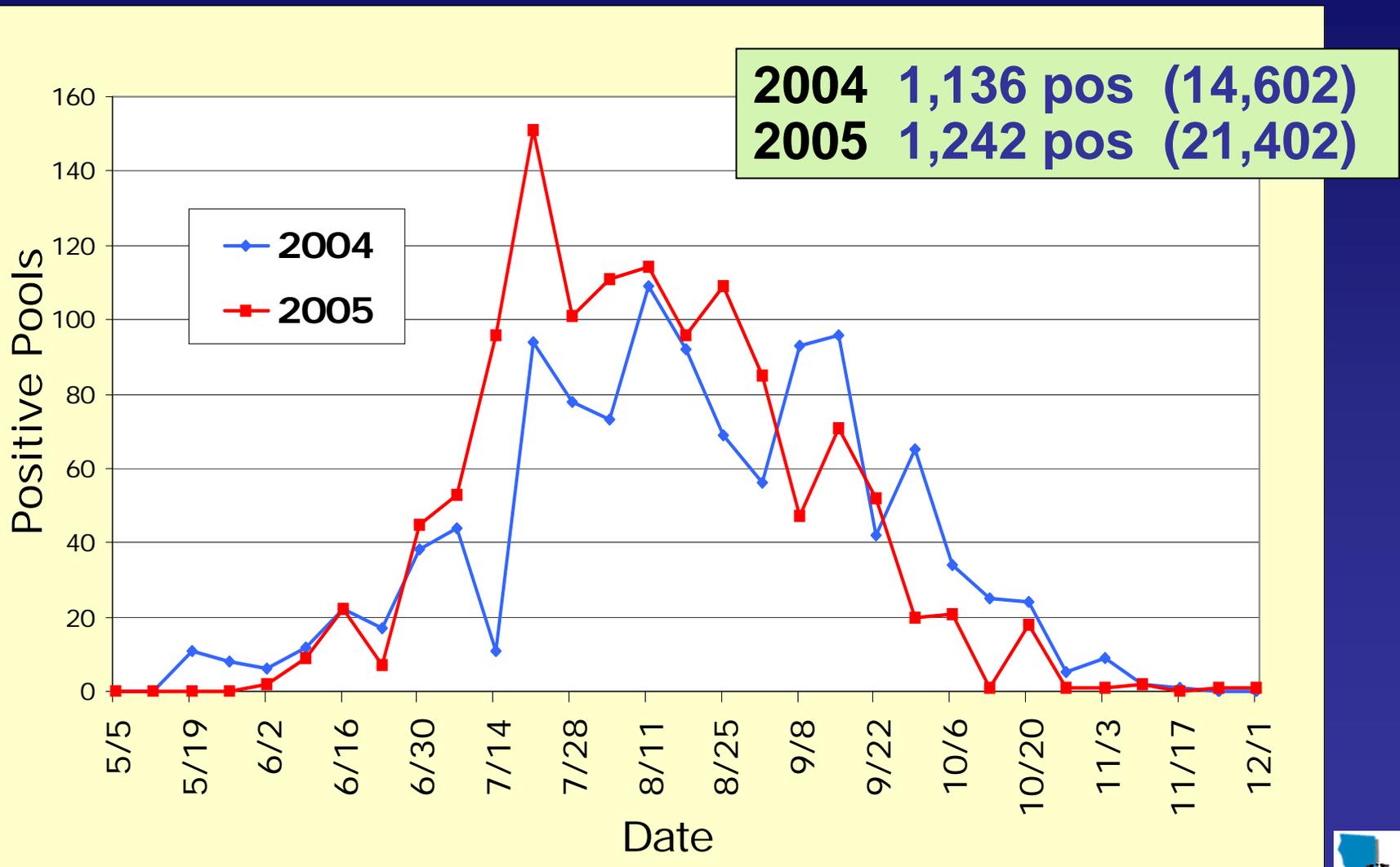
- **First positive squirrel: June 10, 2005**
  - **Placer County**
- **Prevalence (PCR) was 27% (48 / 180)**
- **Similar prevalence in dead birds (35%)**

# WNV Activity in Mosquitoes in 2005



# WNV Activity in Mosquitoes

## number positive pools

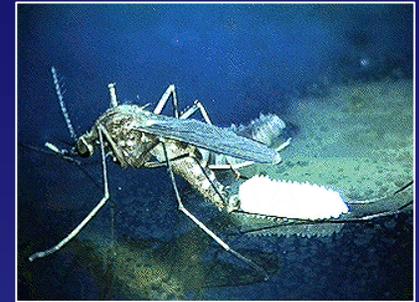


# WNV Positive Mosquito Species

1,242 pos. pools / 21,402 mosquitoes tested

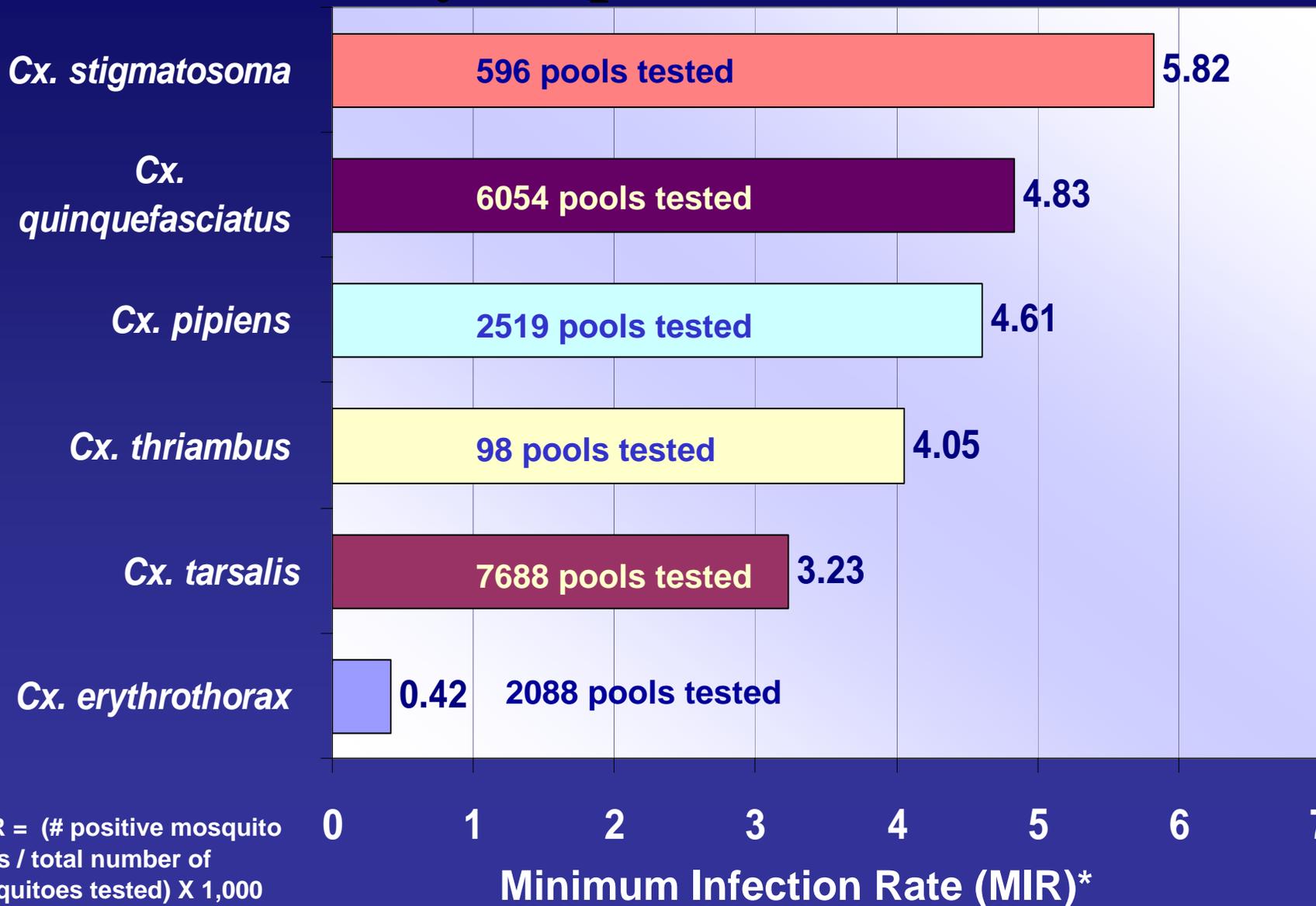
## Culex

<i>quinquefasciatus</i>	476	(38%)
<i>tarsalis</i>	460	(37%)
<i>pipiens</i>	240	(19%)
<i>stigmatosoma</i>	33	(2.7%)
<i>erythrothorax</i>	26	(2.1%)
<i>thriambus</i>	7	(<1%)



Plus *Anopheles freeborni* (1)

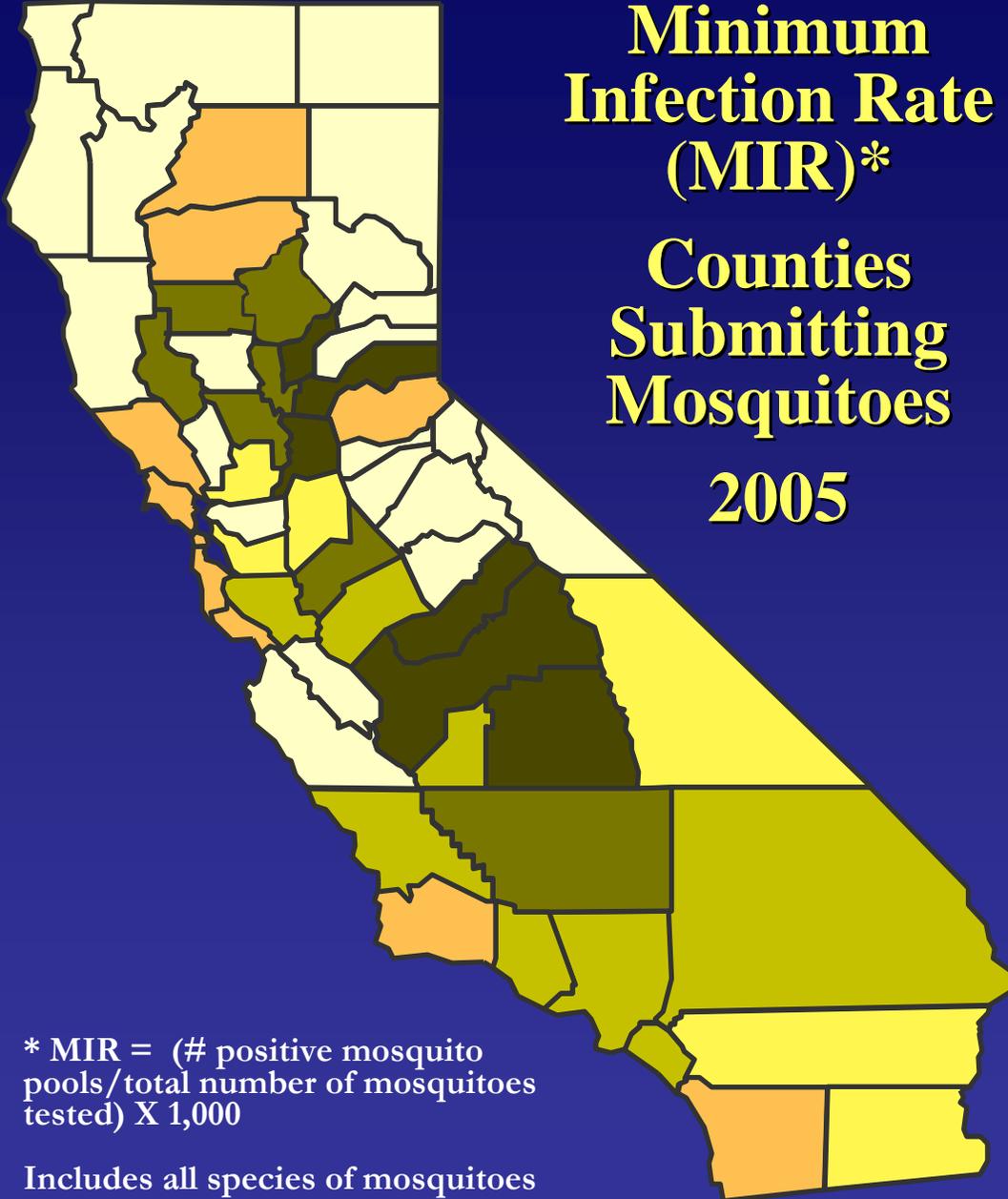
# Minimum Infection Rates (per 1,000) by Species July - September 2005



# Minimum Infection Rate (MIR)\*

## Counties Submitting Mosquitoes

### 2005



Sacramento	7.3	
Placer	5.9	
Fresno	4.9	$\geq 4.0$
Tulare	4.5	
Yuba	4.4	
Madera	4.3	
Yolo	3.7	
Stanislaus	3.6	
Butte	2.8	
Sutter	2.7	$\geq 2.0$
Lake	2.4	
Glenn	2.4	
Kern	2.0	
San Bernardino	1.9	
Los Angeles	1.7	
Ventura	1.7	
Kings	1.5	$\geq 1.0$
San Luis Obispo	1.5	
Santa Clara	1.4	
Merced	1.2	
Orange	1.0	
Imperial	0.8	
Riverside	0.8	
San Joaquin	0.8	
Solano	0.6	$\geq 0.1$
Alameda	0.5	
Inyo	0.3	
Contra Costa	0.1	
No positive pools	0	
No mosquitoes tested		

\* MIR = (# positive mosquito pools / total number of mosquitoes tested) X 1,000

Includes all species of mosquitoes



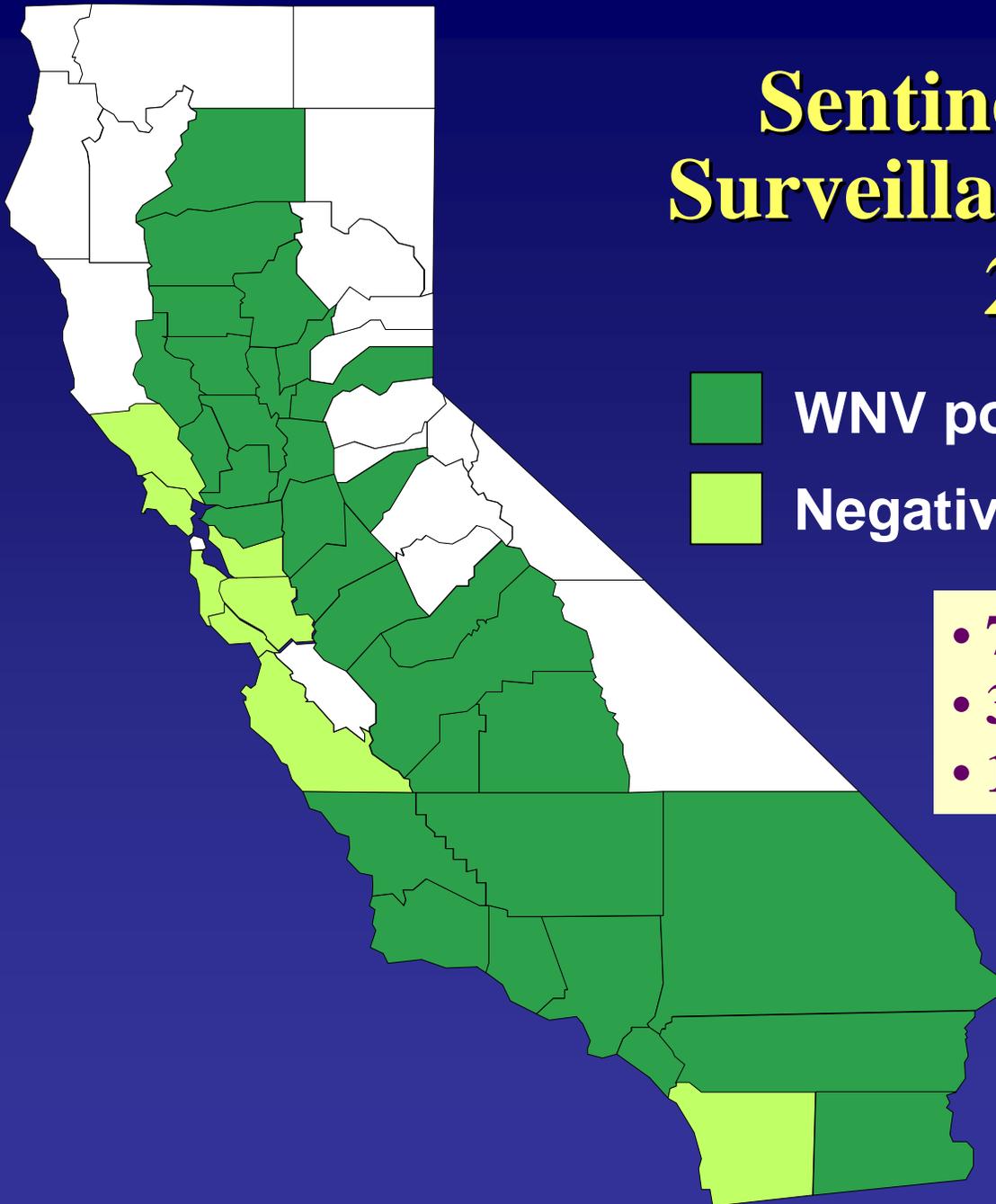
# WNV Activity in Sentinel Chickens in 2005



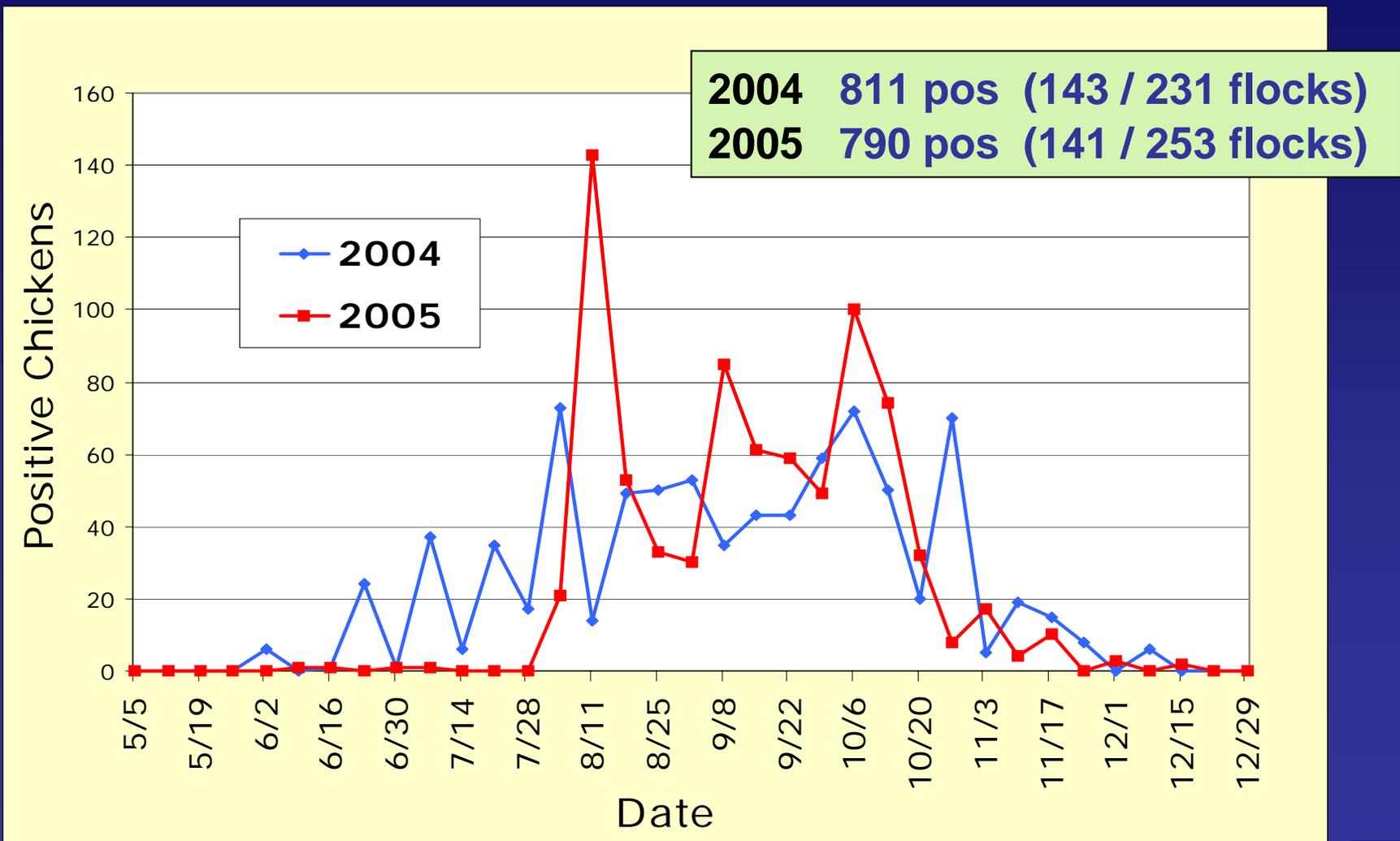
# Sentinel Chicken Surveillance Program 2005

-  WNV positive flock
-  Negative flock

- 790 seroconversions
- 31 counties
- 141 / 253 flocks

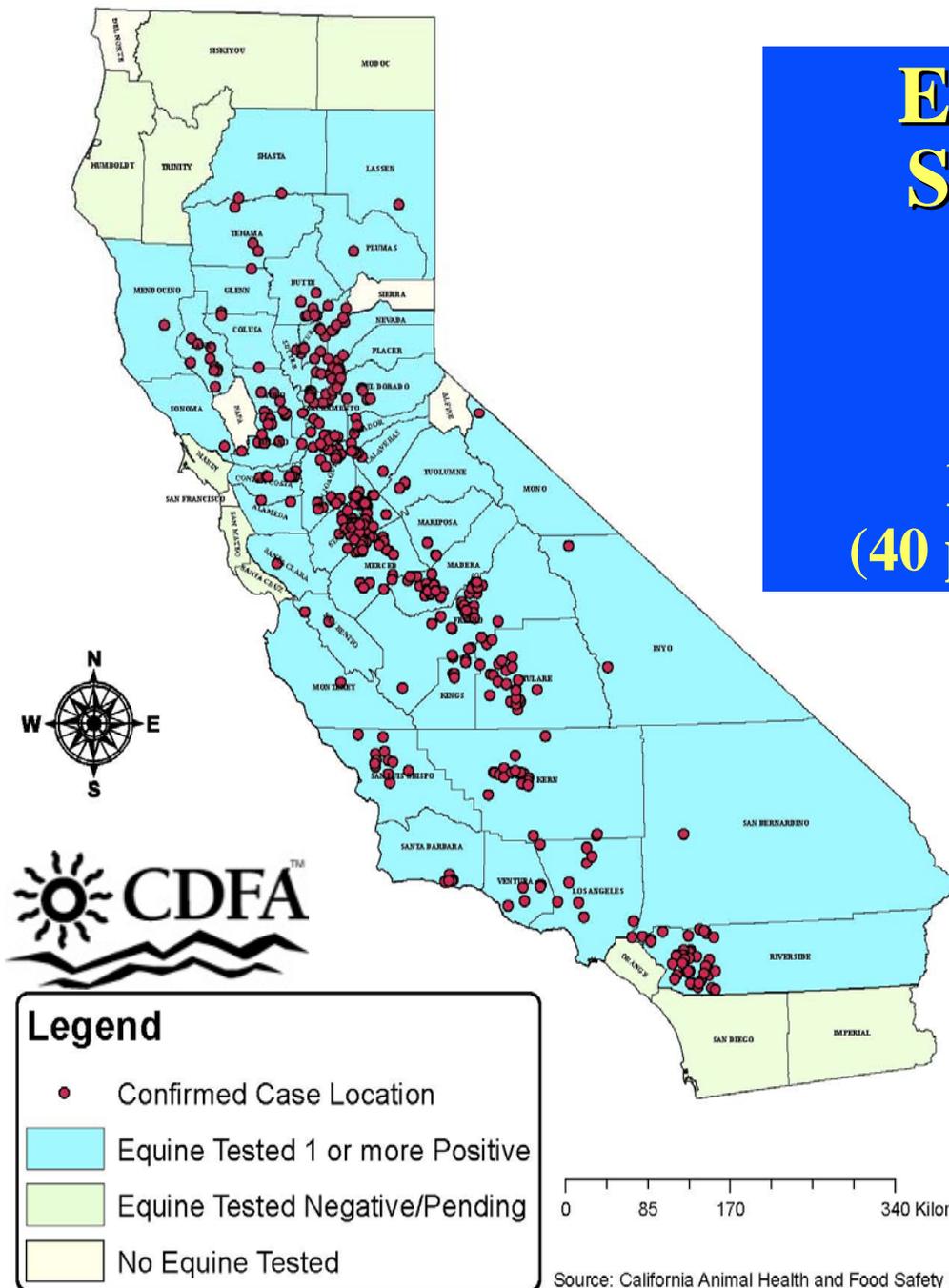


# WNV Activity in Sentinel Chickens



# Equine WNV Surveillance 2005

456 cases  
1,295 tested  
(40 positive counties)



2004: 540 cases

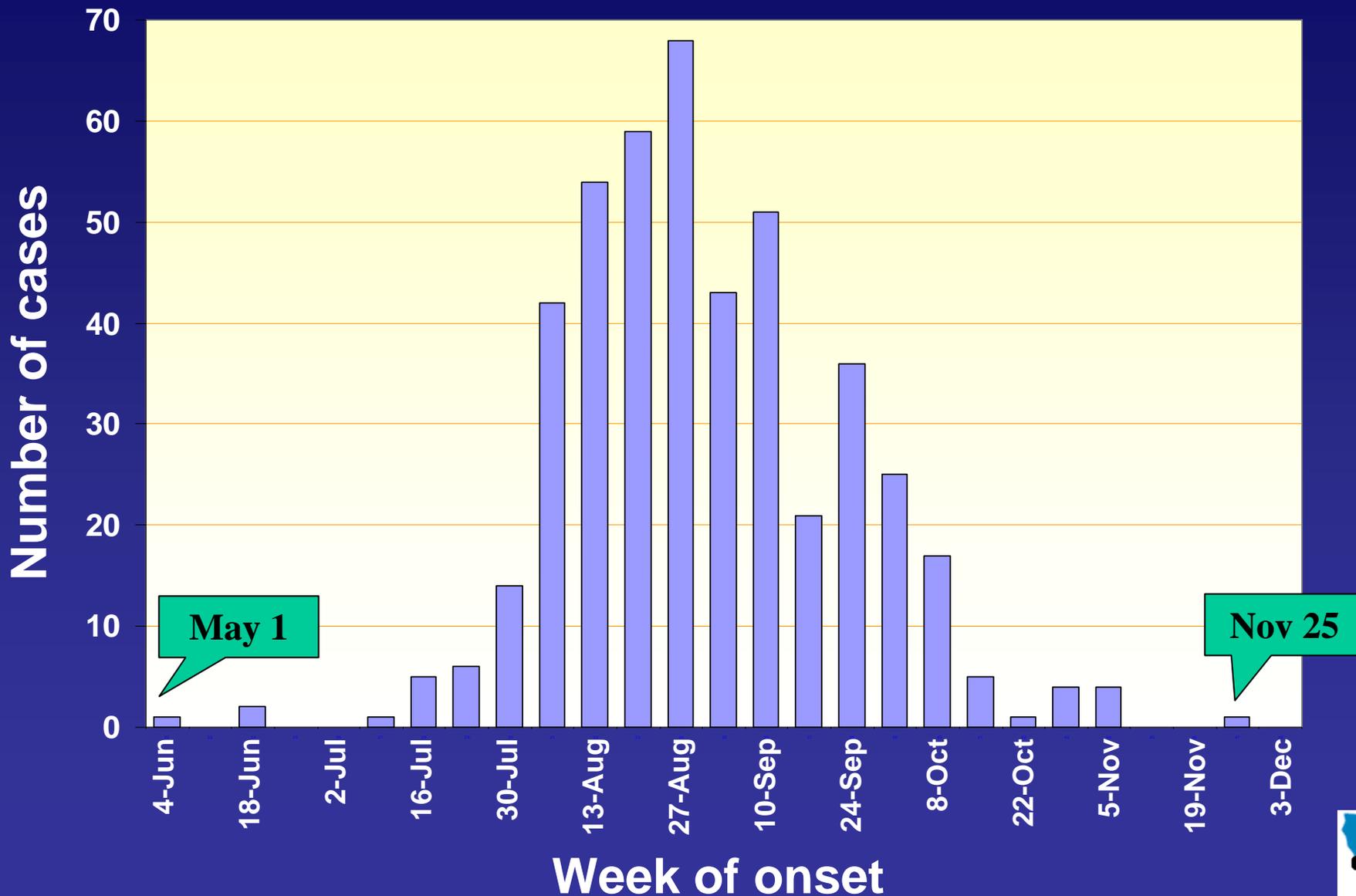


# 2005 Equine WNV Data

- 456 WNV infected horses (40 counties)
- 200 (44%) died / euthanized
- Vaccination status
  - 20 properly vaccinated
  - 78 improperly vaccinated
  - 342 non-vaccinated
- Median age: 13 years (4 mos – 40 years)



# Week of Onset for Equine WNV Cases California, 2005



# **\$12 million appropriated in state budget to enhance and expand mosquito control**

- **By July 26, 2005, initial applications from local agencies had been reviewed and \$9.0 million awarded to 75 local agencies**
- **Through December 2005, \$10.7 million had been awarded to 81 agencies in 47 of California's 58 counties**
- **In 2006, the remaining \$1.0 million will be awarded for early season mosquito control**



We're hoping for a quieter year in 2006!



**INSIDE**  
**Casino support**  
Marysville's City Council urges a "yes" vote in a November advisory referendum on a proposed Indian casino.  
► Page B2

## FIGHTING

### THE CONCERN

Many residents are troubled because the chemical used includes an ingredient the federal government listed as a possible carcinogen.

The Sacramento Bee

# METRO

[www.sacbee.com/news](http://www.sacbee.com/news)

# West Nile cases keep climbing

**ON PAGE A1**

mph during aerial spray help distribute the above 10 mph are too An area for aerial was added to the Friday, Jennifer woman, said cover the area earlier from spray winds Corde

Dr. Glenn Trochet - the Sacramento County public health officer at the center of the controversial mosquito spraying plan - is basing her decisions on years of experience.

insecticide assault Aug. 8-10. It covered 50,000 acres in northern parts of Sacramento County.

Aerial spraying over 66,000 acres in southern Sacramento County was grounded again Friday night by Delta winds, as it has been since Aug. 12. Ideally, the district likes winds of about 5

**SATURDAY**  
August 20, 2005  
OBITUARIES B4  
EDITORIALS B6  
WEATHER B8  
\*\*

## FIGHTING MOSQUITOES

# Region has first W. Nile death

Victim near Lodi and county's rising cases cited by officials as crowd questions use of aerial pesticides.

**THE NUMBERS**  
Sacramento County's total of West Nile virus cases rises to 36.

**THE SCENE**

By Carrie Peyton Dahlberg  
BEE STAFF WRITER

As the first Northern California West Nile virus death was reported, Sacramento County's

# Related Posters by DHS Staff

- **Barclay:** WNV in wild birds: Temporal difference in species impact
- **Carney:** Utilizing the spatiotemporal DYCAST risk modeling system to predict human WNV cases in CA
- **Erickson:** WNV education in California: Regional perspectives
- **Gavali:** West Nile encephalitis outcomes
- **Kjemtrup:** Long-term health effects of WNV fever patients in California: 2004 results and initial results for 2005-2006
- **Marcus:** West Nile virus in California 2004-2005
- **Patiris:** Serological time-course investigation of flavivirus inoculated chickens

